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Book Review

Advances in the Ecology of Lake Kariba edited by Jacques Moreau, published by University of Zimbabwe Publications (1997) ISBN 0-908 307-54-3

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The publication of "Advances in the ecology of Lake Kariba" was timely coming four decades after the formation of Lake Kariba. This book fills a definite ecological gap in our understanding of reservoir ecology in general and Lake Kariba in particular. The last major publication by Balon and Coche (1974) is now out of date and "Advances in the ecology of Lake Kariba" reflects on the new situation.

The "Advances in the ecology of Lake Kariba" is divided into ten chapters. The first chapter focuses on the nutrients and their regulation factors. Unlike McLachlan and Mclachlan (1971); and Bowmaker (1976) which were limited geographically, this study covered the entire length of the lake. The nutrient status of Lake Kariba has not changed much in the last 40 years. In the littoral habitats dense macrophyte beds and benthic algae were supported by nutrients trapped in the sediment. The pelagic zone is supported by nutrients associated to suspended solids imported by rivers. Siltation is one of the major threats to the aquatic ecosystem in Zimbabwe. Many rivers and small lakes have completely silted. An estimation of the state of siltation in Lake Kariba is missing in this chapter.

Chapter two looks at the contribution of nitrogen fixation to the nitrogen budget of Lake Kariba. This is the first time such a study has been conducted in Lake Kariba and the primary data obtained is extremely useful. The predictive model developed which purportedly shows that alkalinity, pH, conductivity and light penetration are useful predictors of biological nitrogen fixation could be misleading. For a regression analysis to be valid there must be dependent and independent variables that certainly is not the case in this analysis.

Chapter three examines phytoplankton spatial and temporal distribution. This is the first quantitative phytoplankton investigation covering the whole lake. The analysis of the changes that have taken place in the pytoplankton community since the creation of the lake was incisive. However, I found the comparison between Lake Kariba and the Greater Lakes of Africa unconvincing. Lake Kariba is a reservoir only 40 years old whereas the Great Lakes of Africa are natural lakes which are thousands of years of old. The rationale behind the comparisons is not clear.

Chapter four is a review of zooplankton ecology which looks at the impact of fish predation on species composition, daily and seasonal variations in zoooplankton abundance. The importance of rivers as a sources of nutrients for zooplankton abundance is highlighted. Unfortunately nothing is new in this Chapter. Masundire's (1993) doctoral thesis adequately tackles most of the issues addressed in this review article.

Chapter five gives a description of the present draw-down zone vegetation and compares it with older records. The interactions between vegetation and grazing herbivores is briefly discussed. It is suggested that herbivory speeds up the carbon and nutrient turnover and may increase the leakage of nutrients during inundation. It would have been more interesting in this

chapter for the author to discuss the effects of recent droughts on the vertical pattern of vegetation along the shore.

Macrophyte species diversity distribution and abundance is well tackled in Chapter 6. The reasons for the low submerged macrophyte species diversity (seven species) is explained. Whilst it is true that 3m annual fluctuations, could be responsible for the low species diversity, it must be pointed out that these annual lake level fluctuations are beneficial to an extent because of their nutrient input in the littoral zone. It is also unfortunate that floating macrophytes were not studied. The water hyacinth is now the biggest threat to both the fishing and tourism industry in Lake Kariba.

Chapter seven examines the ecology and production of the benthic invertebrate fauna 30 years after dam closure. Valuable primary fauna previously not reported on Lake Kariba is reported. However, the benthic biomass figures reported could be misleading since it included shells. One is not sure as to why dead organisms were included in the study as they are surely not part of the biomass.

Chapter eight tackles a very interesting aspect of the ecology of Lake Kariba. The feeding habits and growth of the Nile Crocodile which had not been investigated in Lake Kariba are reported. One of the major findings in the study is that there is no major competition between crocodiles and artisanal fishermen. The crocodiles are only eating 10–15 percent of what is removed by the artisanal fishery. The limitations of force feeding in the determination of gastric avacuation rate should have been highlighted.

The importance of fish-eating birds in the artisanal fishery of Lake Kariba was investigated in Chapter nine. No such previous study had been undertaken in Lake Kariba and the primary data obtained certainly advances our ecological knowledge of Lake Kariba. It is estimated that fish eating birds consume 16 percent of catch from the artisanal fishery. However, I have reservations about the method used to estimate daily feeding consumption. Food consumption estimated in captive birds is likely to be quite different from that in the wild. Chapter 10 and Chapter 11 are a summary of the work covered in the previous chapters.

The major weakness of this publication is that fish and fisheries studies are completely ignored. The successful colonisation of the pelagic zone by the exotic *Limnothrissa miodon* led to the establishment of a capital intensive multimillion dollar pelagic fishery. Several hundred people are employed in this industry and the sustainability of this industry is a topical issue which this book fails to address. Lake Kariba is shared between two countries, Zimbabwe and Zambia, and ecological studies from both countries will certainly give a better insight into the ecology of the lake. Unfortunately this book is a compilation of work done on the Zimbabwean side only and this does not give a complete picture of the ecology of Lake Kariba.

Despite the criticisms above, "Advances in the Ecology of Lake Kariba" is a valuable compilation of the most recent work on Lake Kariba and is a useful point of refereene for all research scientists.

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